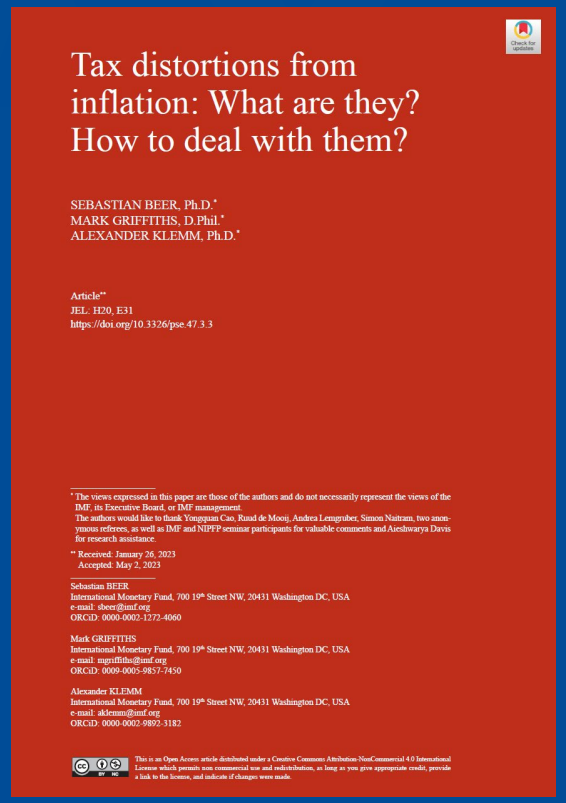

Tax distortions from inflation: What are they? How to deal with them?

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FISCAL AFFAIRS

Tax Distortions from Inflation: What are They? How to Deal with Them?

JANUARY 16, 2024
INSTITUTE OF PUBLIC FINANCE

Sebastian Beer and Alexander Klemm

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Inflation and Taxation

- Introduction
- Fixed Parameters of the Tax System
- Timing Issues
- Inflationary Gains

Inflation has risen and the impact on taxes is noticeable…

- People may notice real increases in tax bills from
  - Paying taxes on high nominal capital gains
  - Rising marginal tax rates from bracket creep
  - Reduced purchasing power from tax refunds

- Easy to notice with high inflation, but raises deeper questions
  - What is the impact of non-neutrality w.r.t. inflation, and will lowering inflation be sufficient to address this?
  - What would a neutral system be like, and what is the impact of addressing inflation only partially (e.g., only for capital gains)?
  - Many answers in quite old literature (Diamond, 1975)

...raising deep questions about tax system design.

Many more interactions between inflation and tax, which I will not cover:

- Aggregate demand
  - Tax increases disinflationary

- Prices and costs
  - Inflationary
    - But important not to confuse impact on price level with impact on structural inflation

- Inflation “tax”
  - Metaphorical use to describe cost of inflation
  - Seigniorage—alternative to rather than form of tax

Even expected inflation has real effects under nonneutral tax systems.

- Expected (and not hyper) inflation in pure market economy:
  - Prices (including interest) adjust, agents make decisions based on real prices
  - Minor real implications:
    - Reduced holding of cash
    - Menu costs
      - Possibly low in digitalized era

- Nonneutral tax system
  - Fixed parameters of the tax system (e.g., “bracket creep”)
  - Timing issues (e.g., depreciation, payment deadlines)
  - Taxation of inflationary gains

Tax and Inflation

- Introduction
- **Fixed Parameters of the Tax System**
- Timing Issues
- Inflationary Gains

Fixed parameters in the tax system create problems…

- Specific excises, fees (and fines)
  - Good reason some excises are specific rather than ad valorem (e.g., addressing externalities)
    - Imperfect fix: set in foreign currency
- Taxes that are percentages with fixed thresholds
  - "Bracket creep"
  - VAT threshold
    - no country adjusts for inflation
  - Thresholds for simplified, alternative minimum taxes, etc.

Table 1. Adjustment of Income Tax Thresholds

No inflation adjustment	Regular adjustment	
	Unclear process	Automatic
131 countries	Argentina	Austria[1]
	Azerbaijan	Canada
	Belgium	Chile
	Colombia	Denmark
	Costa Rica	Israel
	Ecuador	Netherlands
	Finland	Serbia[2]
	France	Taiwan, POC[3]
	Germany	United States
	Honduras	Venezuela
	Iran	
	Norway	
	Paraguay	
	Peru	
	South Africa	
	Sweden	
	Turkey	
	Ukraine	
	Uzbekistan	

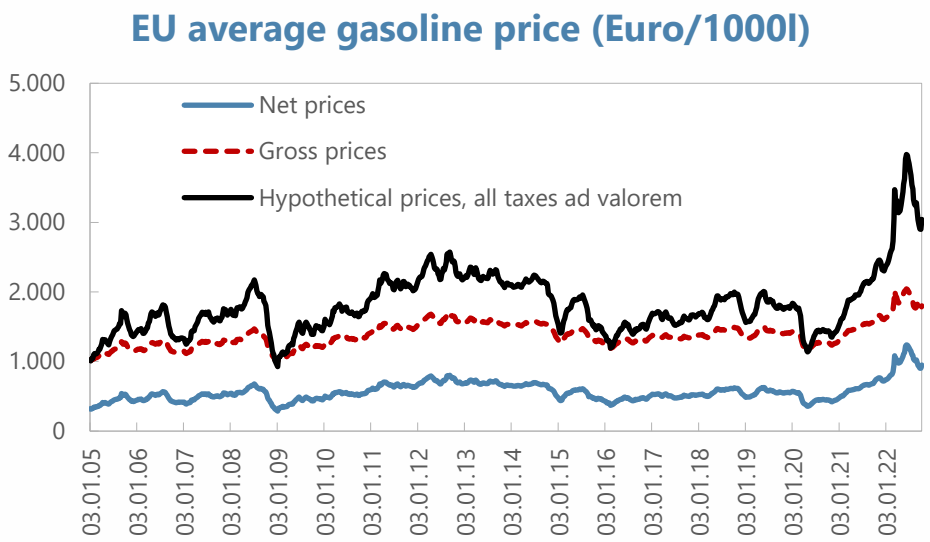
[1] All but the highest bracket are indexed since 2022
[2] Adjusted for average wage growth
[3] If inflation > 3%.

Source: Authors' Compilation based on IBFD and official websites.

...but the solution is trivial

- Adjust excises, thresholds etc. with inflation
  - Politically bracket creep might be convenient as hidden tax increase

- For some excises/tariffs switch to ad valorem
  - Not an option for Pigouvian taxes on goods with high price volatility



Tax and Inflation

- Introduction
- Fixed Parameters of the Tax System
- **Timing Issues**
- Inflationary Gains

Timing of the payments can create problems…

- Many taxes are paid with delay (e.g., small business might pay months after the end of the business year)
  - Reduced real value of taxes (Tanzi, 1977)
- Fixed penalties for late payment could be eroded by inflation
  - Time saving could exceed penalty
- Penalty interest rates sometimes fixed in law
  - Incentive to delay payments
  - (incentive to overpay taxes when inflation is low, and a symmetric rate is applied)

- Timing of deduction of cost of sales/depreciation: next section

...which can be alleviated.

- Short of introducing an inflation-neutral system, problems can be reduced by bringing forward tax payments
  - Withholding taxes (not necessarily final), PAYE systems
  - Advance corporation tax
    - Based on expected profits
    - If based on historical profits, adjust for inflation
  - Frequent asset revaluation (property tax), even if through a rough inflation index
  - Inflation-adjust assessed tax until paid
  - Strengthen tax administration

Tax and Inflation

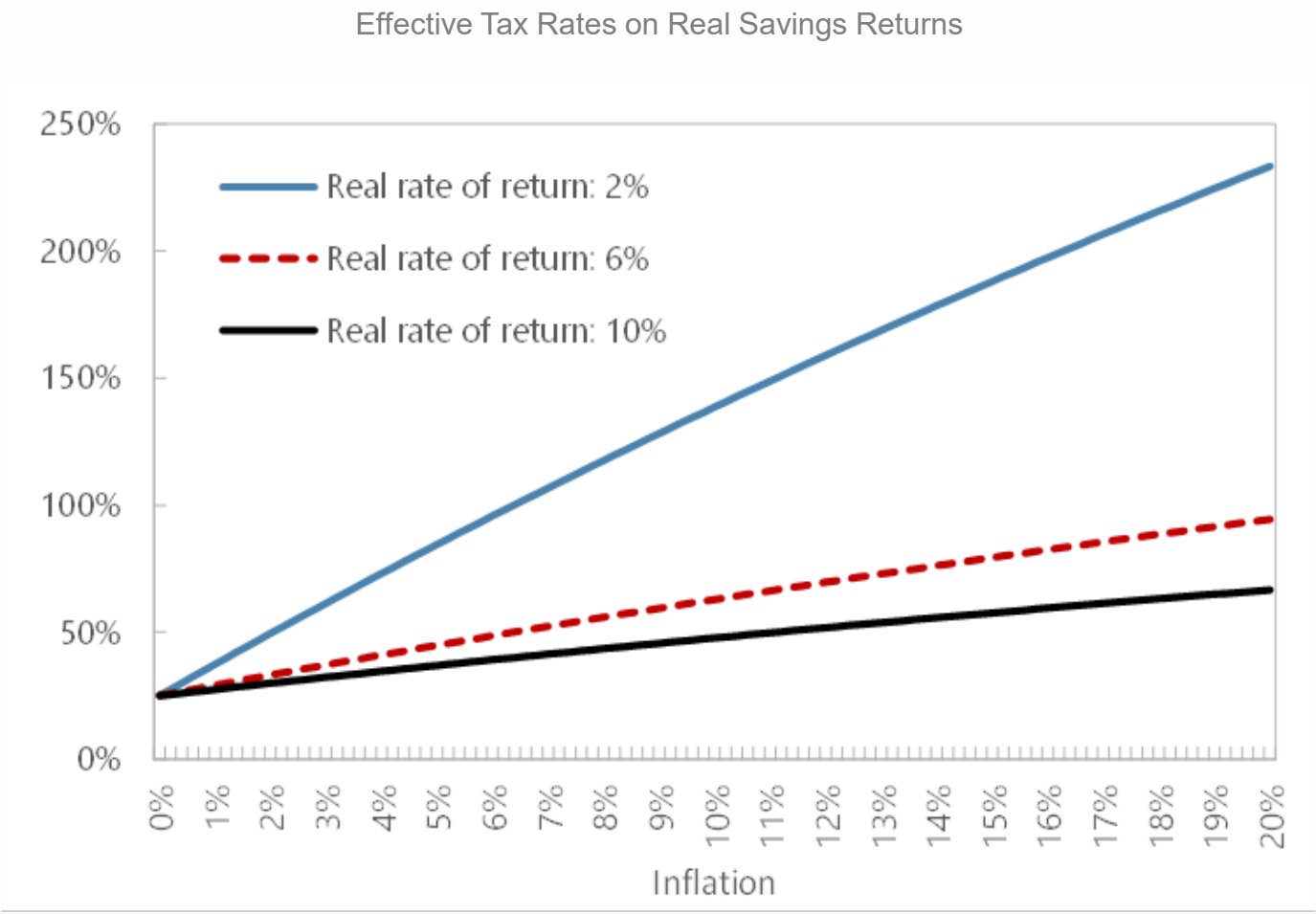
- Introduction
- Fixed Parameters of the Tax System
- Timing Issues
- **Inflationary Gains**

Taxing nominal gains on household savings causes distortions…

- Imagine an asset that pays some real return
  - If inflation rises, nominal returns rise: $i = (1+r)(1+\pi) - 1$
  - The effective tax rate of real tax / real return rises as a result!
    - $r_{after\ tax} = \frac{1+(1-t)i}{1+\pi} - 1 = r(1-t) - \frac{t\pi}{1+\pi}$
    - $\mathrm{ETR} = \frac{r - r_{after\ tax}}{r} = t\left(1 + \frac{\pi}{r(1+\pi)}\right)$

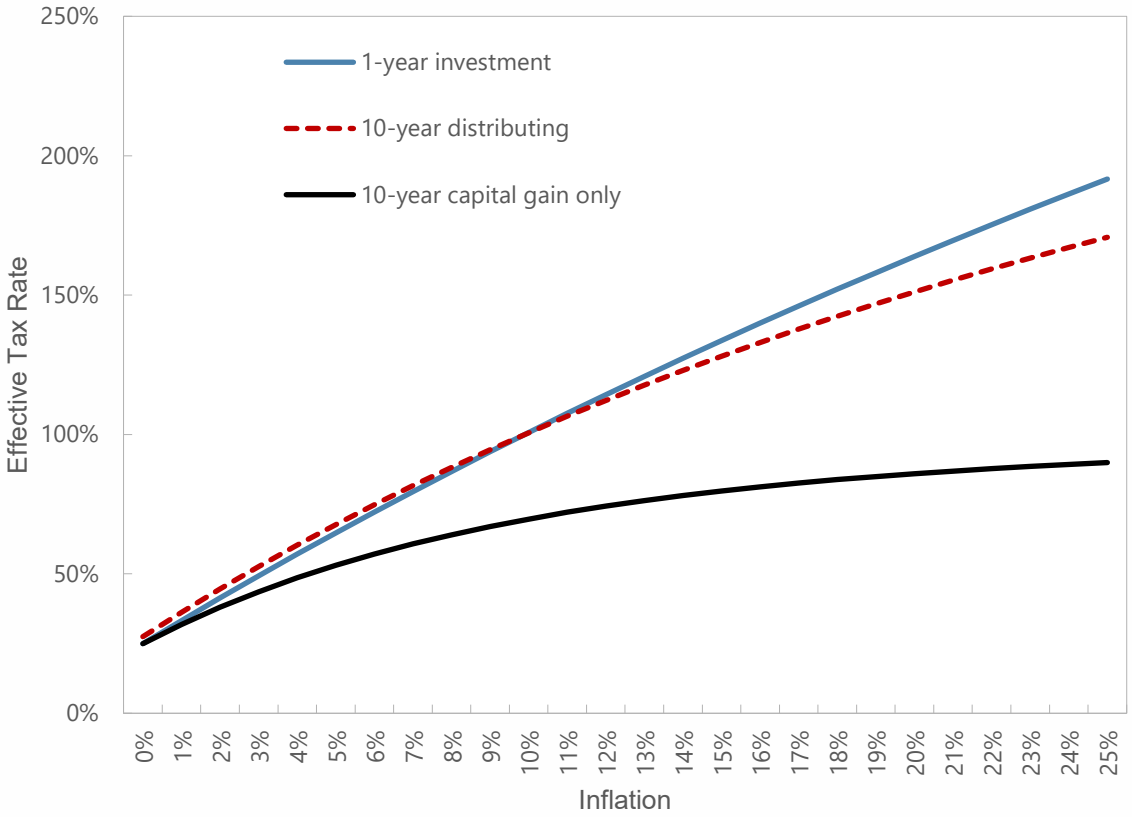
- Even for relatively low rates of inflation, the effect is notable

...which are notable even at low rates...



Notes: Assumed tax rate of 25 percent.

...which compound over time.



- Effect smaller on assets with capital gains (as only taxed on realization)
- Some countries tax only real capital gains
- Achieves neutral capital gains tax…
  - …but even greater preference for capital gains over distributions!

Assumptions: tax rate: 25 percent, real return: 3 percent, real discount rate: 0 percent. For the 10-year bond, all net interest receipts are assumed to be reinvested at the same conditions.
Source: Authors' calculations.

Policy solutions

- Taxation of inflationary gains
  - More difficult to address than previously-discussed problems!
  - Diamond (1975) suggests inflation adjustment on the original value of asset.
  - Either fully adjust system…
    - … or don't, but avoid adjusting just selected types of incomes (e.g., capital gains)

Taxing nominal gains in the corporate sector creates problems…

- Sales and their related costs do not coincide in time
- Inflation affects nominal profits
  - Cannot be fixed by indexing of profits

...reducing the value of depreciation allowances...

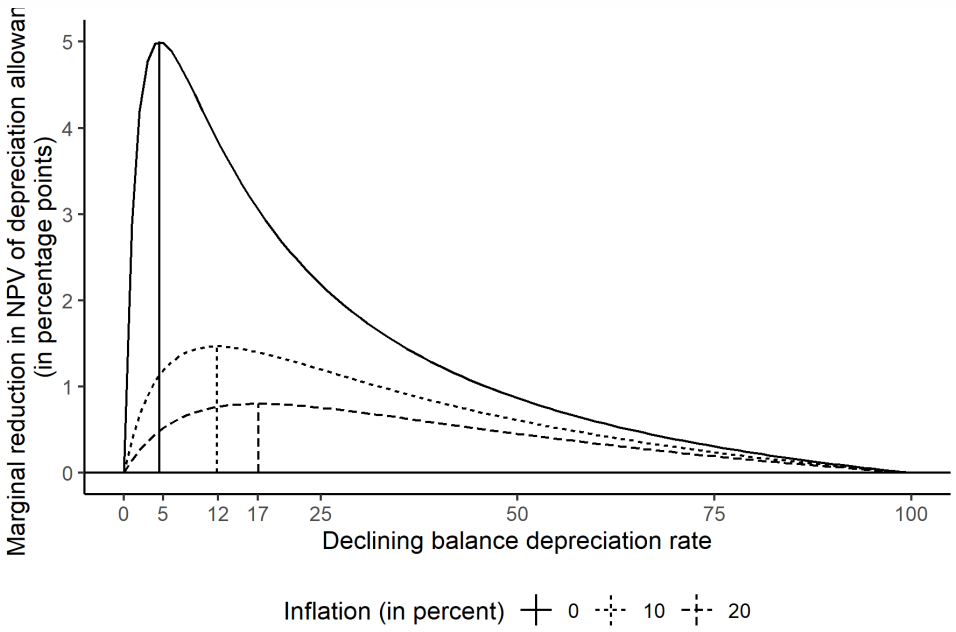
- $A(\pi) = \sum_{s=1}^{\infty} \frac{\phi(1-\phi)^{s-1}}{((1+r)(1+\pi))^{s-1}} = \phi \frac{(1+r)(1+\pi)}{(1+r)(1+\pi)-(1-\phi)}$
  - $\frac{\partial A}{\partial \pi} = \frac{(\phi-1)\phi(1+r)}{[\pi(1+r)+r+\phi]^2} \leq 0$

- Inflation thus raises the cost of capital
  - $-(1-A\tau) + \frac{f'(K)(1-\tau)-\delta(1-A\tau)}{r} = 0$

$$\Leftrightarrow f'(K) = \frac{r+\delta}{1-\tau}(1-A\tau)$$

- Cobb-Douglas: $\frac{\partial K}{\partial \pi}\frac{1}{K} \approx \tau \frac{\partial A}{\partial \pi} < 0$
  - E.g., CIT rate: 22%, depreciation: 25%, inflation: 2% ⇒ semi-elasticity of capital: 0.42

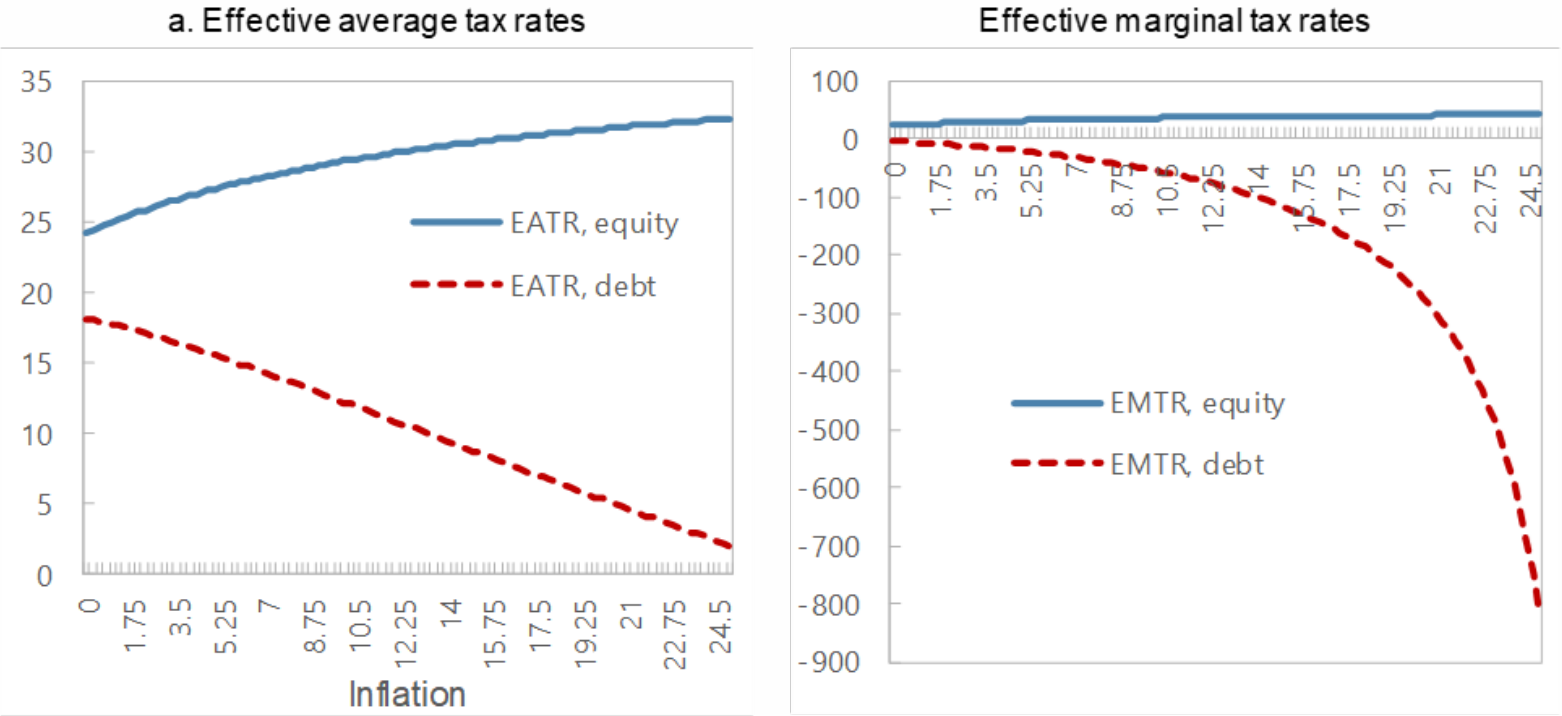
Marginal impact of inflation on NPV



...exacerbating debt bias...

- $f'(K) = \frac{r+\delta}{1-\tau}(1 - A\tau) - \frac{s\tau}{1-\tau}\left(r + \frac{\pi}{1+\pi}\right) \Rightarrow$ max debt issuance (unless additional agency cost)

Figure 1. Effective Tax Rates as a Function of Inflation



Notes: The calculations assume a CIT rate of 25 percent, both true economic depreciation and depreciation allowance of 12¼ percent, a real interest rate of 5 percent, and for the EATR, a financial return of 20 percent.
Source: Authors' calculations.

....with ambiguous net impact.

Dependent variable: percentage change of real asset stock				
Type of investment asset	Construction	Intellectual property	Machinery	ICT
CIT rate	-0.156***	-0.057	-0.241***	-0.167
	[0.038]	[0.081]	[0.064]	[0.236]
Inflation	0.109	-0.195	-0.111	-0.145
	[0.084]	[0.202]	[0.119]	[0.800]
CIT rate*Inflation	-0.014 *	-0.029 *	-0.035**	-0.043
	[0.008]	[0.017]	[0.017]	[0.053]
log(Population)	-3.248	9.417	15.628***	22.128
	[2.405]	[5.876]	[3.206]	[18.456]
Unemployment rate	-0.299***	-0.466***	-0.371***	-0.904**
	[0.051]	[0.116]	[0.070]	[0.426]
log(GDP)	-6.004***	-3.374 *	-5.413***	-21.718***
	[0.928]	[1.888]	[1.237]	[5.485]
GDP growth	0.026	0.117	0.218***	0.525 *
	[0.811]	[1.744]	[1.653]	[5.348]
Intercept	53.681***	2.347	-10.237	83.126 *
	[9.642]	[16.181]	[11.607]	[48.669]
Observations	500	522	520	401
Adjusted R^2	0.561	0.448	0.63	0.228

Notes: Table summarizes results of OLS regressions. All specifications include a set of country and a set of year-fixed effects. The variable CIT rate is centered at its mean of 25 percent; the variable Inflation is centered at its median of 4 percent. *, **, and * indicate statistical significance at the 10, 5, and 1 percent level, respectively. Standard errors in square brackets are heteroscedasticity robust.**

Possible solutions

- Fiscal units: convert each flow by an inflation adjustment
  - complex
  - Scope for manipulation (dates of transactions become highly tax relevant)
  - Costs likely outweigh benefits (except economies with structurally high inflation)

- Certain rent taxation proposals can help
  - R-base cash flow tax: no debt bias, no investment distortion
  - ACE: neutral with respect to depreciation allowances; reduced debt bias (none if ACC)

Conclusions

- Expected inflation has real impact under non-neutral tax system
  - Unexpected inflation even more so (triggers capital gains/losses)

- Non-neutralities arise for different reasons
  - Nominal parameters in tax system:
    - easy to fix through indexation
  - Timing (delayed payments and refunds):
    - Hard to resolve but can be mitigated by bringing payments forward and charging inflation-adjusted interest rate
  - Taxation of nominal gains
    - Household savings and corporate profits, offsetting effect imperfect
    - Difficult to address comprehensively
      - At least avoid making biases worse through selective adjustment (capital gains)
      - Consider efficient corporate tax reforms that also reduce inflationary impact through depreciation allowance and debt bias